<u>What Is Claimed Is</u>:

1. A system for aggregating multiple information channels across a network, the system comprising:

modules implementing a trunking protocol transparent to layer one and layer two of the network layer hierarchy using packet encapsulation and fragmentation;

modules implementing a packet scheduling algorithm for distributing packets across the information channels being aggregated; and

modules implementing an information channel aggregation controller for controlling the information channels being aggregated.

2. The system of claim 1, wherein the information channels comprise standard modem connections.

3. The system of claim 1, wherein the information channels comprise DSL lines.

4. The system of claim 1, wherein the information channels comprise T1 lines.

5. The system of claim 1, wherein the information channels comprise T3 lines.

6. The system of claim 1, wherein the information channels comprise layer one and layer two technologies.

7. The system of claim 1, wherein the information channels comprise a combination of two or more of the following: standard modem connections; DSL lines; T1 lines; T3 lines; and layer one and layer two technologies.

8.   The system of claim 1, wherein layer one of the network layer hierarchy comprises the physical layer of the OSI reference model.

9.   The system of claim 1, wherein layer two of the network layer hierarchy comprises the data link layer of the OSI reference model.

10.   The system of claim 1, wherein the modules implementing the trunking protocol manage the distribution of packets across the network, the trunking protocol modules comprising:
        a packet encapsulation routine;
        a packet fragmentation routine; and
        a packet order preservation routine.

11.   The system of claim 10, wherein the packet encapsulation routine comprises either one or both of software or logic for generating a trunking protocol header and inserting the trunking protocol header in a packet.

12.   The system of claim 11, wherein the trunking protocol header comprises a sequence number and a plurality of fields compliant with the Internet protocol.

13.   The system of claim 10, wherein the packet fragmentation routine comprises either one or both of software and logic for fragmenting a packet formed by the Internet protocol into smaller packet fragments so that the transmission rate of the aggregated information channels is optimized.

14. The system of claim 13, wherein either one or both of software or logic for fragmenting a packet formed by the Internet protocol into smaller packet fragments comprises:

either one or both of software and logic for inserting a layer four protocol header and an Internet protocol header into a single packet fragment; and

either one or both of software and logic for inserting the trunking protocol header into all packet fragments.

15. The system of claim 14, wherein layer four comprises the transport layer of the OSI reference model.

16. The system of claim 10, wherein the packet order preservation routine comprises:

either one or both of software and logic for identifying out-of-sequence packets;

either one or both of software and logic for providing a buffer for storing out-of-sequence packets;

either one or both of software and logic for providing a timer for monitoring the delay of packets; and

either one or both of software and logic for ordering the out-of-sequence packets.

17. The system of claim 1, wherein the packet scheduling algorithm modules comprise:

either one or both of software or logic for creating packet traffic queues;

either one or both of software or logic for checking the length of the packet traffic queues; and

either one or both of software or logic for sending a packet to the shortest length packet traffic queue.

18.   The system of claim 1, wherein the information channel aggregation controller modules comprise:

a configuration maintenance routine;

an auto discovery of active lines routine;

an error monitoring and recovery routine; and

a maintenance of aggregation groups routine.

19.   The system of claim 18, wherein the configuration maintenance routine comprises managing static and dynamic configuration information for the information channels.

20.   The system of claim 19, wherein the static configuration information comprises:

parameters associated with the information channels;

properties associated with the aggregation groups; and

status information associated with the information channels indicating the information channels that are active and non-active.

21.   The system of claim 19, wherein the dynamic configuration information comprises information exchanged with other information channel aggregation controllers reachable across the information channels.

22.   The system of claim 18, wherein the auto discovery of active lines routine comprises either one or both of software and logic for monitoring the status information associated with the information channels to reveal the information channels that are active.

23. The system of claim 18, wherein the error monitoring and recovery routine comprises:

either one or both of software and logic for monitoring network failures in the information channels;

either one or both of software and logic for modifying the status information associated with the information channels experiencing network failures to indicate that the information channels experiencing network failures are non-active; and

either one or both of software and logic for re-routing the traffic in the information channels experiencing network failures to other information channels.

24. The system of claim 18, wherein the maintenance of aggregation groups routine comprises:

either one or both of software and logic for forming aggregation groups comprising a subset or all of the information channels being aggregated;

either one or both of software and logic for monitoring the static and dynamic information associated with the information channels to ensure that the information channels being aggregated are active;

either one or both of software and logic for adding information channels to the aggregation groups; and

either one or both of software and logic for removing information channels from the aggregation groups.

25. The system of claim 24, wherein the software and logic for removing information channels from the aggregation groups comprise either one or both of software and logic for updating static configuration information associated with the information channels being removed.

26. A method for aggregating multiple information channels across a network, the method comprising:

providing a trunking protocol transparent to layer one and layer two of the network layer hierarchy using packet fragmentation and encapsulation;

scheduling packets across each of the information channels being aggregated; and

controlling the information channels being aggregated.

27. The method of claim 26, wherein the information channels comprise standard modem connections.

28. The method of claim 26, wherein the information channels comprise DSL lines.

29. The method of claim 26, wherein the information channels comprise T1 lines.

30. The method of claim 26, wherein the information channels comprise T3 lines.

31. The method of claim 26, wherein the information channels comprise layer one and layer two technologies.

32. The method of claim 26, wherein the information channels comprise a combination of two or more of the following: standard modem connections; DSL lines; T1 lines; T3 lines; and other layer one and layer two technologies.

33. The method of claim 26, wherein layer one of the network layer hierarchy comprises the physical layer of the OSI reference model.

34.   The method of claim 26, wherein layer two of
the network layer hierarchy comprises the data link layer of
the OSI reference model.

35.   The method of claim 26, wherein the trunking
protocol manages the distribution of packets across the
network, the trunking protocol comprising:
          a packet encapsulation routine;
          a packet fragmentation routine; and
          a packet order preservation routine.

36.   The method of claim 35, wherein the packet
encapsulation routine comprises generating a trunking protocol
header and inserting the trunking protocol header in a packet.

37.   The method of claim 36, wherein the trunking
protocol header comprises a sequence number and a plurality of
fields compliant with the Internet protocol.

38.   The method of claim 35, wherein the packet
fragmentation routine comprises fragmenting a packet formed by
the Internet protocol into smaller packet fragments so that
the transmission rate of the aggregated information channels
is optimized.

39.   The method of claim 38, wherein fragmenting a
packet formed by the Internet protocol into smaller packet
fragments comprises:
          preserving a layer four protocol header and an
Internet protocol header in a single packet fragment; and
          inserting the trunking protocol header into all
packet fragments.

40. The method of claim 39, wherein layer four comprises the transport layer of the OSI reference model.

41. The method of claim 35, wherein the packet order preservation routine comprises:

identifying out-of-sequence packets;

providing a buffer for storing out-of-sequence packets;

providing a timer for monitoring the delay of packets; and

ordering the out-of-sequence packets.

42. The method of claim 26, wherein scheduling packets across each of the information channels being aggregated comprises:

creating packet traffic queues associated with each information channel being aggregated;

checking the length of the packet traffic queues; and

sending a packet to the shortest length packet traffic queue.

43.   The method of claim 26, wherein controlling the information channels being aggregated comprises:

managing configuration information associated with the information channels;

monitoring the configuration information associated with the information channels to reveal the information channels that are active;

monitoring network failures in the information channels;

modifying the configuration information associated with the information channels experiencing network failures to indicate that the information channels experiencing network failures are non-active;

forming aggregation groups comprising a subset or all of the information channels being aggregated;

adding information channels to the aggregation groups; and

removing information channels from the aggregation groups.

44.   A system for aggregating multiple information channels across a network, the system comprising:

a premises service unit for aggregating multiple information channels at a user's site;

a service gateway unit for aggregating multiple information channels at the user's site or within the network; and

a trunking protocol transparent to layer one and layer two of the network layer hierarchy for distributing packets between the premises service unit and the service gateway unit using packet fragmentation and encapsulation.

45.   The system of claim 44, wherein the information channels comprise standard modem connections.

46.   The system of claim 44, wherein the information channels comprise DSL lines.

47.   The system of claim 44, wherein the information channels comprise T1 lines.

48.   The system of claim 44, wherein the information channels comprise T3 lines.

49.   The system of claim 44, wherein the information channels comprise layer one and layer two technologies.

50.   The system of claim 44, wherein the information channels comprise a combination of two or more of the following: standard modem connections; DSL lines; T1 lines; T3 lines; and layer one and layer two technologies.

51.   The system of claim 44, wherein layer one of the network layer hierarchy comprises the physical layer of the OSI reference model.

52.   The system of claim 44, wherein layer two of the network layer hierarchy comprises the data link layer of the OSI reference model.

53.   The system of claim 44, wherein the premises
service unit comprises:

modules implementing a packet scheduling algorithm
for distributing the packets to the multiple information
channels;

modules implementing a packet collection software
routine for collecting packets from the multiple information
channels;

modules implementing an aggregation controller
software routine for controlling the information channels
being aggregated;

modules for implementing a packet encapsulation
software routine for generating a trunking protocol header and
inserting the trunking protocol header in a packet;

modules for implementing a packet fragmentation
software routine for fragmenting a packet formed by the
Internet protocol into smaller packet fragments;

modules for implementing a packet reordering routine
for ordering packets that are out-of-sequence;

modules for implementing a trunking protocol header
removal software routine for removing the trunking protocol
header from packets to be distributed across the user's site;

modules for implementing a packet de-fragmentation
software routine for restoring the packets to their original
packet length; and

modules for implementing a packet forwarding
software routine for forwarding the packets to the service
gateway unit and across the user's site.

54.   The system of claim 53, wherein the trunking
protocol header comprises a sequence number and a plurality of
fields compliant with the Internet protocol.

55. The system of claim 53, wherein the packet scheduling algorithm modules comprises:

software routines for creating packet traffic queues;

software routines for checking the length of the packet traffic queues; and

software routines for sending a packet to the shortest length packet traffic queue.

56. The system of claim 53, wherein the modules implementing an aggregation controller software routine comprise:

a configuration maintenance software routine for managing configuration information associated with the information channels being aggregated;

an auto discovery of active lines software routine for monitoring the configuration information associated with the information channels to reveal the information channels that are active;

an error monitoring and recovery software routine; and

a maintenance of aggregation groups software routine.

57. The system of claim 56, wherein the error monitoring and recovery software routine comprises:

monitoring network failures in the information channels;

modifying the configuration information associated with the information channels experiencing network failures to indicate that the information channels experiencing network failures are non-active; and

re-routing the traffic in the information channels experiencing network failures to other information channels.

58. The system of claim 56, wherein the maintenance of aggregation groups software routine comprises:

forming aggregation groups comprising a subset or all of the information channels being aggregated;

monitoring the configuration information associated with the information channels to ensure that the information channels being aggregated are active;

adding information channels to the aggregation groups; and

removing information channels from the aggregation groups.

59. The system of claim 44, wherein the service gateway unit comprises:

modules implementing a packet forwarding routine for sending all packets destined for the premises service unit from a router to the service gateway unit;

modules implementing a packet scheduling algorithm for distributing the packets to the multiple information channels;

modules implementing a packet collection software routine for collecting packets from the router;

modules implementing an aggregation controller software routine for controlling the information channels being aggregated;

modules for implementing a packet encapsulation software routine for generating a trunking protocol header and inserting the trunking protocol header in a packet;

modules for implementing a packet fragmentation software routine for fragmenting a packet formed by the Internet protocol into smaller packet fragments;

modules for implementing a packet reordering routine for ordering packets that are out-of-sequence;

modules for implementing a trunking protocol header removal software routine for removing the trunking protocol header from packets to be distributed to the Internet;

modules for implementing a packet de-fragmentation software routine for restoring the packets to their original packet length; and

modules for implementing a packet forwarding software routine for forwarding the packets to the premises service unit and to the Internet.

60. The system of claim 59, wherein the trunking protocol header comprises a sequence number and a plurality of fields compliant with the Internet protocol.

61. The system of claim 59, wherein the packet scheduling algorithm modules comprises:

software routines for creating packet traffic queues;

software routines for checking the length of the packet traffic queues; and

software routines for sending a packet to the shortest length packet traffic queue.

62. The system of claim 44, wherein the trunking protocol comprises:

a packet encapsulation software routine;

a packet fragmentation software routine; and

a packet order preservation software routine.

63. The system of claim 62, wherein the packet encapsulation software routine comprises generating a trunking protocol header and inserting the trunking protocol header in a packet.

64. The system of claim 63, wherein the trunking protocol header comprises a sequence number and a plurality of fields compliant with the Internet protocol.

65. The system of claim 62, wherein the packet fragmentation software routine comprises fragmenting a packet formed by the Internet protocol into smaller packet fragments so that the transmission rate of the aggregated information channels is optimized.

66. The system of claim 65, wherein fragmenting a packet formed by the Internet protocol into smaller packet fragments comprises:

inserting a layer four protocol header and an Internet protocol header into a single packet fragment; and

inserting the trunking protocol header into all packet fragments.

67. The system of claim 66, wherein layer four comprises the transport layer of the OSI reference model.

68. The system of claim 62, wherein the packet order preservation routine comprises:

identifying out-of-sequence packets;

providing a buffer for storing out-of-sequence packets;

providing a timer for monitoring the delay of packets; and

ordering the out-of-sequence packets.